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Regionalni razvoj i prekogranična saradnja

ZBORNIK RADOVA

Pirot, april 2023.

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BOOK OF PROCEEDINGS

REGIONALNI RAZVOJ I PREKOGRANIČNA SARADNJA

REGIONAL DEVELOPMENT AND CROSS-BORDER COOPERATION

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Pirot, april 2023.

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BOOK OF PROCEEDINGS OF THE V INTERNATIONAL SCIENTIFIC CONFERENCE

REGIONALNI RAZVOJ I PREKOGRANIČNA SARADNJA
REGIONAL DEVELOPMENT AND CROSS-BORDER COOPERATION

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PREDGOVOR

Ovaj zbornik, koji je pred Vama, sadrži radove sa VI naučne konferencije s međunarodnim učešćem, pod nazivom Regionalni razvoj i prekogranična saradnja, održane 18 novembra 2022. u Pirotu, u organizaciji Srpske akademija nauka i umetnosti – Ogranak SANU u Nišu, Grada Pirota, Privredne komore Pirot, Fakulteta za menadžment Zaječar i Univerziteta Metropolitana.

Tema Naučnog skupa obuxvata opštu problematiku aktuelnog stanja regionalnog razvoja, prekogranične saradnje kao i analize uticaja nove industrijalizacije na regionalni razvoj. U tom smislu tematska područja na koja je ova konferencija bila fokusitrana su bila: Ekonomska politika u službi regionalnog razvoja; Edukacija i razvoj ljudskix resursa u funkciji regionalnog razvoja; Industrija, logistika i transport 4.0 i regionalni razvoj; Međunarodne strategije i projekti i regionalni razvoj; Poljoprivreda, proizvodnja zdrave xrane i turizam u funkciji regionalnog razvoja; Međunarodna logistika i globalni lanci snabdevanja. Kao i ostala pitanja regionalnog razvoja i prekogranične saradnje u okviru kojix su pristigli radovi koji problematizuju pitanja zaštite radnika u vremenima biološkog rata, pristupa proučavanja preduzetništva kao i rada u srpskoj tradiciji, aspekti ruralnog turizma i značaj zdrave xrane i druge srodne teme. Plod konferencije je zbornik naučnix radova pod istim imenom, koji obuxvata 51 rad koji su zadovoljili kriterijume recezentske komisije. Njegovo kritičko čitanje tek predstoji, ali sa sigurnošću možemo reći da, kako tematski, tako i sadržajno mnogi će naći za sebe teme koje ix interesuju. Moramo, takođe, naglasiti da je interes za učešće na konferenciji veoma dobar, o čemu svedoče i prispeli radovi autora iz Srbije, Bugarske, Rusije, R. Srpske, Grčke, Makedonije.

Nakon prošlogodišnje konferencije, koja je zbog poznatix uslova održana on line, organizatori konferencije izražavaju zadovoljstvo što su ponovo imali priliku da domaće i strane autore ugoste na konferenciji u Pirotu i da uživo imaju priliku da slušaju njixova izlaganja. Naravno, i ovaj put nije sve teklo glatko, te u tom smislu neki autori posebno iz inostranstva nisu uspeli da dođu u Pirot već su svoje radove prezentovali putem video prezentacije.

Još jednom priređivači i uredniči Zbornika izražavaju zaxvalnost svim autorima koji su dostavili svoje radove, koji se nalaze u ovom Zborniku.

U Pirotu, Mart 2023. godine

Urednički odbor

FOREWORD

This collection, which is before you, contains papers from the VI scientific conference with international participation, entitled Regional development and cross-border cooperation, held on November 18, 2022 in Pirot, organized by the Serbian Academy of Sciences and Arts - SANU Branch in Niš, City of Pirot, Pirot Chamber of Commerce, Faculty of Management Zaječar and Metropolitan University.

The theme of the Scientific Meeting includes the general issue of the current state of regional development, cross-border cooperation, as well as analysis of the impact of new industrialization on regional development. In this sense, the thematic areas on which this conference was focused were: Economic policy in the service of regional development; Education and development of human resources in the function of regional development; Industry, logistics and transport 4.0 and regional development; International strategies and projects and regional development; Agriculture, healthy food production and tourism in the function of regional development; International logistics and global supply chains. As well as other issues of regional development and cross-border cooperation, within which works have been received that problematize the issues of worker protection in times of biological warfare, approaches to the study of entrepreneurship as well as work in the Serbian tradition, aspects of rural tourism and the importance of healthy food and other related topics. The fruit of the conference is a collection of scientific papers under the same name, which includes 51 papers that met the criteria of the review committee. Its critical reading is yet to come, but we can say with certainty that, both thematically and in terms of content, many will find topics that interest them. We must also emphasize that the interest in participating in the conference is very good, as evidenced by the submitted works of authors from Serbia, Bulgaria, Russia, R. Srpska, Greece, Macedonia.

After last year's conference, which was held online due to known conditions, the conference organizers express their satisfaction that they once again had the opportunity to host domestic and foreign authors at the conference in Pirot and to have the opportunity to listen to their presentations live. Of course, not everything went smoothly this time either, and in that sense, some authors, especially from abroad, did not manage to come to Pirot and instead presented their works through a video presentation.

Once again, the organizers and editors of the Collection express their gratitude to all the authors who submitted their works, which are included in this Collection.

In Pirot, March 2023 Editorial board

MULTIPLE-CRITERIA ASSESSMENT OF HOTEL WEBSITES

Gabrijela Popović, PhD, Associate Professor[1]
Đorđe Pucar, MSc, Teaching Assistant[2]

Abstract: *Today, the interaction between the hotel and guests has changed under the influence of the Internet. Tourists – future hotel guests – use the websites to gain all pieces of information needed for making a decision – should visit the hotel and surroundings or not. With that matter, hotels need to have well-prepared and organized webistes. Previously said points to the necessity of measuring the quality of websites. In this article, the multiple-criteria assessment of the hotel websites based on the SWARA, PSI, and MARCOS methods is proposed. The four websites of the four-star hotels situated in Eastern Serbia are evaluated against five criteria. The prime goal, which involves emphasizing the applicability of the multiple-criteria approach and pointing out the key features which should have a quality hotel website, is achieved.*

Keywords: *SWARA, PSI, MARCOS, hotel website, Eastern Serbia.*

Introduction

Nowadays, the way in which tourists chose hotels and tourism destinations has changed under influence of the Internet. Tourists can find the information they need on the websites of the hotels or tourism organizations of the particular area. Esspecially has changed the possibility of booking the hotel, because this could be very easily done over the Internet, by its website, or other adequate platforms that offer a whole spectrum of different tourism accommodations. All these imply that the success of a hotel or certain tourist destination depends on a well-organized and informative website.

The competition in the tourism and hotel industry is very sharp, so the quality of the websites plays an important role in attracting tourists and gaining business success (Stanujkic et al., 2019). The websites represent a tool that enables connecting and fostering relationships with tourists as future or loyal guests. So, the quality of the websites becomes an area that requires significant attention because it has a great part in creating an image of a hotel. All of said leads to the conclusion that measuring the quality of websites is very important and necessary. By measuring the quality of the websites, hotel managers could relatively easily understand what features of the website are good, and which should be improved.

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Factors that influence the quality of the website are various, and it is difficult to define which of them have greater importance relative to others. Sometimes, the factors are mutually conflicting, and giving an advantage to one of them could lead to neglecting others. Multiple-Criteria Decision-Making (MCDM) methods could help in overcoming this issue and enabling successful estimation of the importance of the considered factors i.e. criteria as well as to assess the website's quality according to them.

Until now, many different MCDM methods (Dammak et al., 2016), as well as their appropriate extensions (Afful-Dadzie et al., 2017; Sun et al., 2018; Kahraman et al., 2020; Hinduja & Pandey, 2021; Pelta et al., 2021), are proposed. Besides, this crisp end extended MCDM methods find their application in various business fields as a decision-making aid (Sitorus et al., 2019; Dotoli et al., 2020; Nuhu et al., 2021; Wen et al., 2021; Zakeri et al., 2022). The authors proposed the application of different MCDM methods and models for evaluation of the website quality in many business areas (Li & Sun, 2020; Özkan et al., 2020; Ramyar et al., 2020; Samanlioglu et al., 2020; Shayganmehr & Montazer, 2020).

For the purpose of this article, the subjective-objective model is applied to define the significance of the considered criteria as well as to assess the quality of the websites of the given hotels. For determining the criteria significance the Step-wise Weight Assessment Ratio Analysis - SWARA (Keršuliene et al., 2010) which is of subjective type, and the objective Preference Selection Index – PSI method (Maniya & Bhatt, 2010) are used. The Measurement of alternatives and ranking according to the COmpromise solution – MARCOS method (Stević et al., 2020) is applied for the final estimation of the hotel websites. The four hotels placed in Eastern Serbia are submitted under evaluation, and they are assessed against five evaluation criteria. With the aim of presenting the applicability of the proposed approach, the article is organized as follows: in Section 1 the proposed model is presented; Section 2 contains a case study; at the end, the conclusion is given.

1. Methodology

1.1. SWARA method

The SWARA method is proposed by Keršuliene et al. (2010). Until now, it is used for determining the criteria weights and facilitation of decision-making processes in various business fields (Radović & Stević, 2018; Alinezhad & Khalili, 2019; Balali et al., 2022). The computational procedure of the SWARA method relies on the one presented in the paper of Stanujkic et al. (2015).

Step 1. Arrange the chosen criteria in descending order consistent with expected significance.

Step 2. The decision-maker should associate the relative significance of criterion *j* according to the previous criterion (*j*-1). This should be performed for every criterion, starting from the second.

Step 3. The coefficient k_j should be calculated by using the following Eq.:

$$k_j = \begin{cases} 1 & j = 1 \\ s_j + 1 & j > 1 \end{cases}, \quad (1)$$

where s_j is the ratio of the comparative importance of the average value.

Step 4. The recalculated weight q_j should be calculated by using Eq. (2):

$$q_j = \begin{cases} 1 & j = 1 \\ \frac{k_j - 1}{k_j} & j > 1 \end{cases}. \quad (2)$$

Step 5. The relative weights of the criteria should be determined in the following manner:

$$w_j = \frac{q_j}{\sum_{k=1}^{n} q_k}, \quad (3)$$

where w_j denotes the relative weights of criterion *j*.

Step 6. In the final step, the alternatives should be ranked in ascending order. The alternative which is in the first place has the highest value of w_j.

1.2. PSI method

The PSI method is introduced by Maniya and Bhatt (2010). The authors applied it to resolving business problems of a different kind (Vahdani et al., 2014; Petković et al., 2017; Bharathi et al., 2022; Lotfabadi et al., 2022). Based on Maniya and Bhatt (2010) and Stanujkic et al. (2017), the computational procedure of PSI method could be illustrated by following a series of steps.

Step 1. Define the goal and determine the evaluation criteria.

Step 2. Form the initial decision-making matrix *D* in the following way:

$$D = [x_{ij}]_{mxn}, \quad (4)$$

where x_{ij} represents ratings of the alternative *i* relative to criterion *j*, *m* denotes the number of alternatives and *n* is the number of criteria.

Step 3. Form the normalized decision-making matrix by using following Eqs.:

$$r_{ij} = \frac{x_{ij}}{\max_i x_{ij}} \ \ if\ j \in B, \quad (5)$$

$$r_{ij} = \frac{\min_i x_{ij}}{x_{ij}} \ \ if\ j \in C, \quad (6)$$

where *B* denotes the benefit criteria, and *C* denotes cost criteria.

Step 4. Compute the preference variation value relative to each criterion in the following manner:

$$\chi_j = \sum_{i=1}^{m} \left(r_{ij} - \bar{r}_j\right)^2, \tag{7}$$

where $\bar{r}_j$ remarks the mean value of normalized ratings of criterion *j* which is computed as follows:

$$\bar{r}_j = \frac{1}{m} \sum_{i=1}^{m} r_{ij}. \tag{8}$$

Step 5. Compute deviation in the preference variation value in the following way:

$$\Omega_j = 1 - \chi_j. \tag{9}$$

Step 6. Define the criteria weights using the Eq. (10):

$$w_j = \frac{\Omega_j}{\sum_{j=1}^{n} \Omega_j}. \tag{10}$$

Step 7. Compute the preference selection index of alternatives in the following manner:

$$S_i = \sum_{j=1}^{n} r_{ij}\, w_j. \tag{11}$$

Step 8. Rank the alternatives submitted under evaluation procedure. Alternative that has the highest value of the preference selection index is positioned on the first place.

1.3. MARCOS method

The MARCOS method is introduced by Stević et al. (2020). Although relatively new, this method proved its usefulness in many studies (Puška et al., 2020a; Puška et al., 2020b; Stević & Brković, 2020; Deveci et al., 2021). The computation procedure of the MARCOS method contains the following steps (Stević, et al. 2020).

Step 1. Form the initial decision-making matrix.

Step 2. Form the extended decision-making matrix that contains the ideal and anti-ideal solutions. The alternative that has the best parameters regarding a particular criterion represents the ideal solution, while the opposite case represents an anti-ideal solution. Determining the ideal and anti-ideal solution could be illustrated by following Eqs.:

$$AAI = \min_j x_{ij} \quad if \;\; j \in B \;\; and \;\; \max_j x_{ij} \quad if \;\; j \in C\,, \tag{12}$$

$$AAI = \max_j x_{ij} \quad if \;\; j \in B \;\; and \;\; \min_j x_{ij} \quad if \;\; j \in C. \tag{13}$$

Step 3. Normalize the extended initial decision-making matrix. The normalization procedure is performed by using Eqs. (5) and (6).

Step 4. Determine the weighted decision-making matrix which is achieved by multiplying normalized matrix values by corresponding weights.

Step 5. Calculate the utility degree of the alternatives K_i by using the following Eq.:

$$K_i^- = \frac{S_i}{S_{aai}}, \tag{14}$$

$$K_i^+ = \frac{S_{aai}}{S_i}, \tag{15}$$

where S_i (i=1, 2, .., m) is the sum of the elements of a difficult matrix:

$$S_i = \sum_{i=1}^{n} v_{ij}. \tag{16}$$

Step 6. Form the utility function of the alternatives $f(K_i)$ by using the following Eq.:

$$f(K_i) = \frac{K_i^+ + K_i^-}{1 + \frac{1-f(K_i^+)}{f(K_i^+)} + \frac{1-f(K_i^-)}{f(K_i^-)}}, \tag{17}$$

where $f(K_i^-)$ denotes the utility function versus the anti-ideal solution and $f(K_i^+)$ represents the utility function versus the ideal solution. These functions are determined in the following way:

$$f(K_i^-) = \frac{K_i^+}{K_i^+ + K_i^-}, \tag{18}$$

$$f(K_i^+) = \frac{K_i^-}{K_i^+ + K_i^-}. \tag{19}$$

Step 7. Rank the alternatives where the best-ranked alternative has the highest value of the utility function.

2. Case Study

The organization and appearance of the hotel websites, better say its quality, influences the level of visitor satisfaction. Because the website visitor represents a potential hotel quest, the quality of the website impacts his/her decision about the reservation of the accommodation in the particular hotel. Many different factors affect the quality of hotel websites. For the need of this research, the factors i.e., criteria which are the base for assessment of the chosen hotel websites are retrieved from the paper of Stanujkic et al. (2017), and they are as follows:

- C_1 – Information about reservations
- C_2 – Information about facilities
- C_3 – Contact information
- C_4 – Information about the surrounding area
- C_5 – Website management

All given pieces of information are important and contribute to the overall impression of a particular website. Additionally, all criteria are of the benefit type.

Four relatively new four-star hotels placed in Eastern Serbia are submitted under evaluation by applying the proposed MCDM approach. The following hotels are concerned:

- The Stara Planina Hotel. This hotel is located in the Stara Planina mountain which is a relatively new and growing sky center of Eastern Serbia. Its website is available at the following address: hotelstaraplanina.com.
- The Jezero Hotel. This hotel is placed on the peaceful coast of Bor Lake. Its website is available at the following address: www.hoteljezero.rs.
- The Ramonda Hotel. The mentioned hotel has been recently built in the beautiful and intact scenery of the Rtanj mountain. Its website is available at the following address: ramondahotel.com.
- The Sunce Hotel. This hotel, located in the Sokobanja Spa, is lately privatized and entirely renewed to meet the high standards of modern tourists and guests. Its website is available at the following address: www.suncehotel.rs.

The initial decision-making matrix, which contains the estimations of the performances of the considered websites of the hotels defined by an expert in the field, is presented in Table 1.

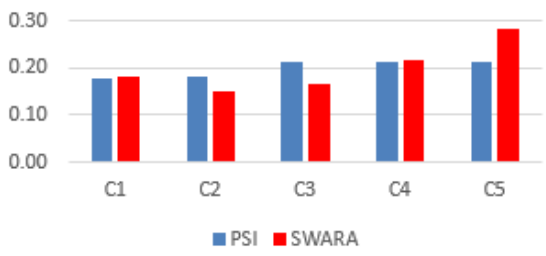
Table 1. The initial decision-making matrix

	C_1	C_2	C_3	C_4	C_5
A_1	3	4	3	3	4
A_2	2	2	4	3	3
A_3	5	5	5	5	5
A_4	5	5	5	3	5

Source: Author`s calculation

First, it is necessary to define the significance of the involved criteria. The subjective-objective approach is used for that matter. The main reason for the application of two MCDM methods for defining the criteria significance is to avoid biased results. For that purpose, evaluation of the criteria is performed by using the SWARA (Keršuliene et al., 2010) as a subjective method and PSI (Maniya & Bhatt, 2010) as an objective method. The obtained results are presented in Figure 1.

Figure 1. The criteria significance obtained by using SWARA and PSI methods



Source: Author`s calculation

Assessment of the considered criteria by using the SWARA method is consigned to one decision-maker. As Figure 1 illustrates, the decision-maker gives the highest significance to criterion C_5 – *Website management*, while the least important is criterion C_2 – *Information about facilities*. The results obtained by the objective PSI method are more equilibrated which means that criteria C_2 – *Contact information*, C_4 – *Information about the surrounding area*, and C_5 – *Website management* have nearly the same weights.

To obtain the overall significance convenient for the further computational procedure, the geomean of the obtained results is determined. The final criteria significances are presented in Table 2.

Table 2. The overall criteria significance

Criteria	Significance
C_1	0.1798
C_2	0.1668
C_3	0.1893
C_4	0.2162
C_5	0.2479

Source: Author`s calculation

Now, the final assessment and ranking of the alternative hotel websites are performed by using the MARCOS method. The obtained results are presented in Table 3.

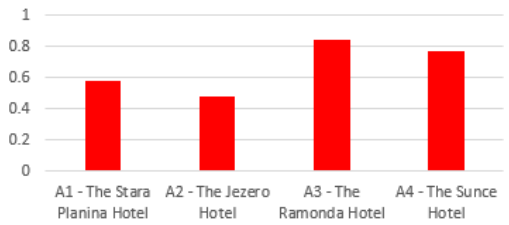
Table 3. The ranking results

	K_i^-	K_i^+	$f(K_i)$	**Rank**
A_1	1.2869	0.6829	0.5768	**3**
A_2	1.0713	0.5685	0.4802	**4**
A_3	1.8843	1.0000	0.8446	**1**
A_4	1.7214	0.9135	0.7715	**2**

Source: Author`s calculation

The final ranking order is illustrated in Figure 2.

Figure 2. The ranking results



Source: Author`s calculation

As the results show, the website of the best quality belongs to the Ramonda Hotel (alternative A_3). This website offers all the required pieces of information in well designed and logical order. The website of the Ramonda Hotel successfully meets all the requirements and left the visitor well-informed and satisfied. The worst-ranked website belongs to the Jezero Hotel. This website does not adequately fulfill all the considered criteria which positioned it in the last place.

3. Conclusion

Websites become a very important connection between hotels and their future guests. Developing a website that successfully fulfills the expectations of the visitors requires careful analysis and appreciation of all influential factors i. e. criteria. In this article, the MCDM model based on the SWARA, PSI, and MARCOS methods is proposed for the assessment of the hotel website quality. The SWARA and PSI methods enabled conducting of subjective-objective analysis and defining of the criteria weights, while the MARCOS method gave the final ranking results of the involved alternatives. Four high-class hotels situated in Eastern Serbia are assessed against five evaluation criteria. The results revealed the website of the Ramonda Hotel as the best-quality one.

It can be concluded that the proposed MCDM approach led to scientific relevant results. All the criteria involved in the decision process are acknowledged, the computation procedure is relatively understandable, and gained results are reliable and justified. Despite the outlined benefits of the proposed approach, there are certain limitations, too. The computational procedure relies on crisp numbers which are not appropriate because the environment is ambiguous so it is very difficult to express the criteria values as single numbers. Application of the methods extended by fuzzy, grey, or neutrosophic numbers would give more reliable results. Furthermore, in the estimation of criteria significance performed by using SWARA methods only one decision-maker was involved. The same is with creating the initial decision-making matrix, more precise with starting evaluation of the given hotel websites. The relevance of the obtained results would be higher if the procedure involved three or more decision-makers. All of these limitations automatically represent suggestions for future research and improvement of the proposed model. Besides, the proposed model could be applied for the facilitation of the decision-making process not only in the tourism and hotel industry but in other business fields as well.

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VIŠEKRITERIJUMSKA OCENA VEB-SAJTOVA HOTELA

Apstrakt: *U savremenim uslovima interakcija između hotela i gostiju se promenila pod uticajem Interneta. Turisti – budući gosti hotela – koriste veb-sajtove radi dobijanja svih informacija neophodnih za donošenje odluke – da li posetiti hotel i okruženje ili ne. Imajući navedeno u vidu, od izuzetne važnosti za hotele jeste posedovanje dobro pripremljenih i organizovanih veb-sajtova. Prethodno rečeno ističe neophodnost ocenjivanja kvaliteta veb-sajtova. U ovom radu predložena je višekriterijumska ocena veb-sajtova hotela zasnovana na SWARA, PSI i MARCOS metodama. Četiri veb-sajta, koja pripadaju hotelima sa četiri zvezdice lociranim u istočnoj Srbiji, ocenjena su u odnosu na pet evaluacionih kriterijuma. Osnovni cilj, koji uključuje naglašavanje primenljivosti viškeriterijumskog pristupa i ukazivanje na ključne karakeristike koje treba da ima kvalitetan veb-sajt hotela, je postignut.*

Ključne reči: *SWARA, PSI, MARCOS, veb-sajtovi hotela, istočna Srbija.*